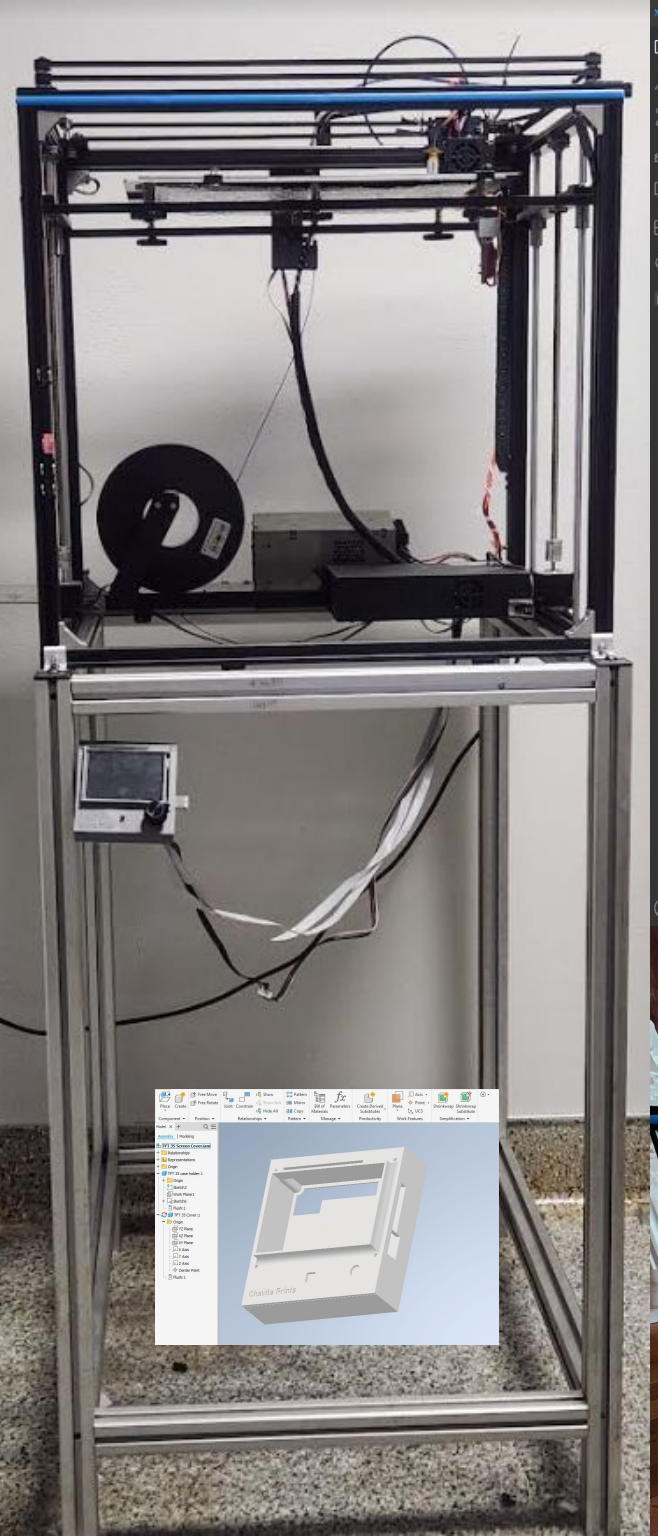
Portfolio

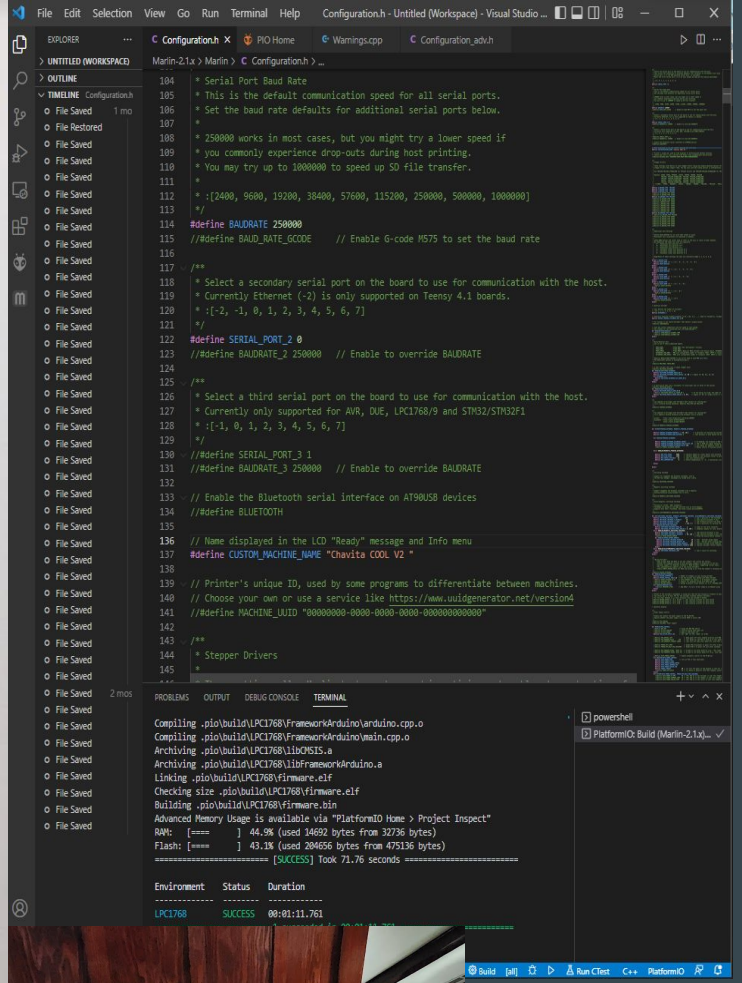
By: Salvador Vargas

•••

Some of my most prolific work from school, work, and personal life.

3D Printing




Configuration.h - Untitled (Workspace) - Visual Studio ...
Configuration.h
PIO Home
Warnings.cpp
Configuration_adv.h
Marlin-2.1.x > Marlin > Configuration.h > ...
* Serial Port Baud Rate
* This is the default communication speed for all serial ports.
* Set the baud rate defaults for additional serial ports below.
* 250000 works in most cases, but you might try a lower speed if
* you commonly experience drop-outs during host printing.
* You may try up to 1000000 to speed up SD file transfer.
* :[2400, 9600, 19200, 38400, 57600, 115200, 250000, 500000, 1000000]
#define BAUDRATE 250000
//#define BAUD_RATE_GCODE // Enable G-code M575 to set the baud rate
* Select a secondary serial port on the board to use for communication with the host.
* Currently Ethernet (-2) is only supported on Teensy 4.1 boards.
* :[-2, -1, 0, 1, 2, 3, 4, 5, 6, 7]
#define SERIAL_PORT_2 0
//#define BAUDRATE_2 250000 // Enable to override BAUDRATE
* Select a third serial port on the board to use for communication with the host.
* Currently only supported for AVR, DUE, LPC1768/9 and STM32/STM32F1
* :[-1, 0, 1, 2, 3, 4, 5, 6, 7]
//#define SERIAL_PORT_3 1
//#define BAUDRATE_3 250000 // Enable to override BAUDRATE
// Enable the Bluetooth serial interface on AT90USB devices
//#define BLUETOOTH
// Name displayed in the LCD "Ready" message and Info menu
#define CUSTOM_MACHINE_NAME "Chavita COOL V2 "
// Printer's unique ID, used by some programs to differentiate between machines.
// Choose your own or use a service like https://www.uuidgenerator.net/version4
//#define MACHINE_UUID "00000000-0000-0000-0000-000000000000"
* Stepper Drivers
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
Compiling .pio\build\LPC1768\FrameworkArduino\arduino.cpp.o
Compiling .pio\build\LPC1768\FrameworkArduino\main.cpp.o
Archiving .pio\build\LPC1768\libCMSIS.a
Archiving .pio\build\LPC1768\libFrameworkArduino.a
Linking .pio\build\LPC1768\firmware.elf
Checking size .pio\build\LPC1768\firmware.elf
Building .pio\build\LPC1768\firmware.bin
Advanced Memory Usage is available via "PlatformIO Home > Project Inspect"
RAM: [====] 44.9% (used 14692 bytes from 32736 bytes)
Flash: [====] 43.1% (used 204656 bytes from 475136 bytes)
[SUCCESS] Took 71.76 seconds
Environment Status Duration
LPC1768 SUCCESS 00:01:11.761
powershell
PlatformIO: Build (Marlin-2.1.x)...

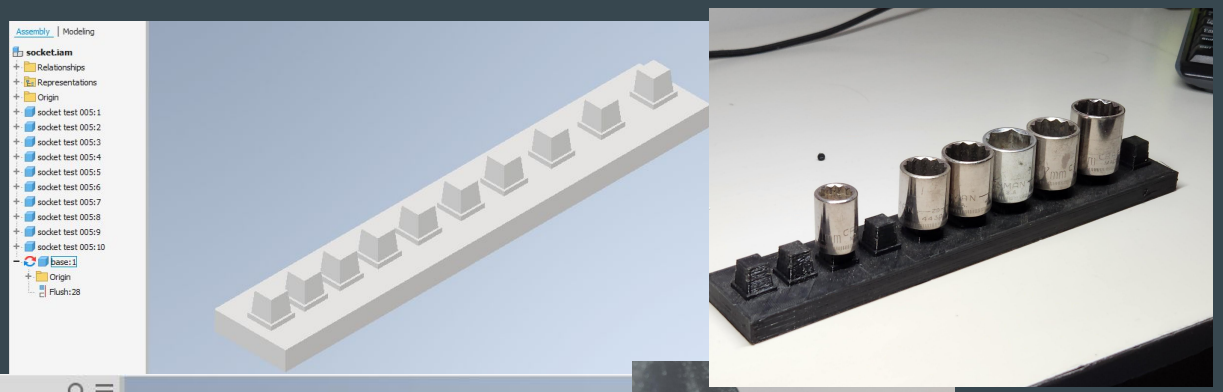
Motherboard shorted and took the opportunity to restore/upgrade the printer.

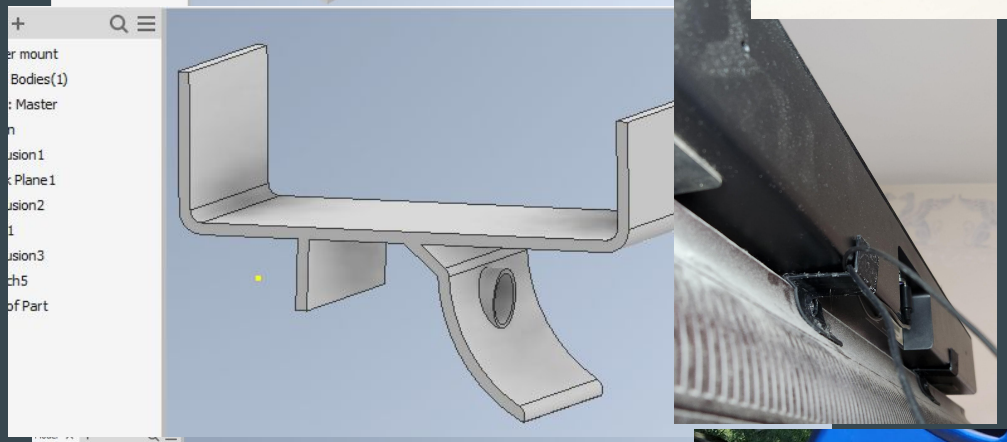
- Upgraded steppers to silent TMC2209
- Used BTT SKR 1.4 logic board as well as TFT 3.5 display
- BL-touch

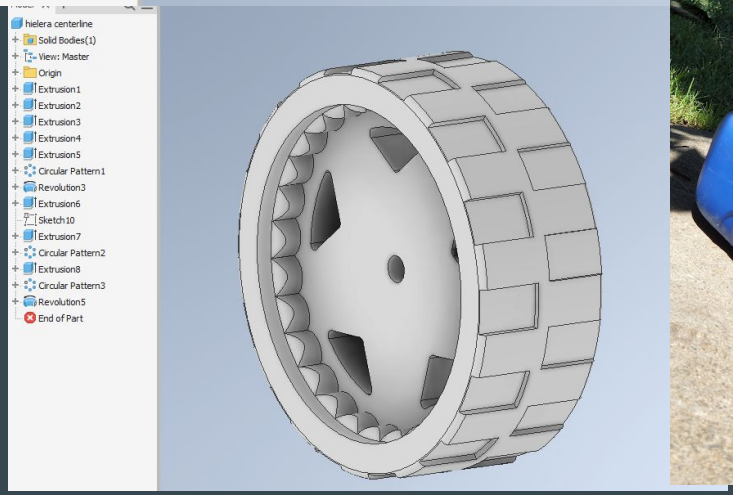
During the project I learned about:

- Firmware and system integration using VisualStudio
- Code troubleshooting and debugging
- Complicated features of 3D printing like linear/pressure advance and bed meshing,

My designs and prints





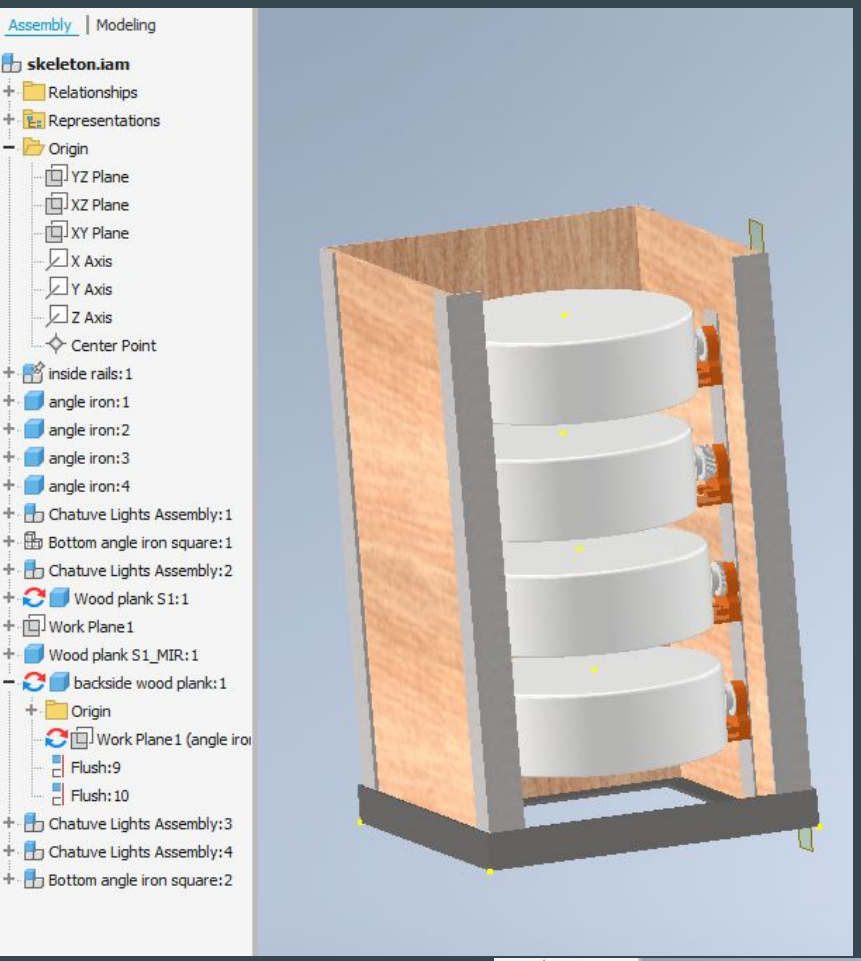


Some designs and prints I've done on my personal time to find solutions for needs/wants.

Top - A socket organizer that hold ⅜ drive sockets with magnets permanently inside for convenience

Mid - A mount which utilizes factory screw locations to hold a sound bar on my TV

Bottom - A wheel replacement for a cooler. I took this opportunity and designed a Centerline Convo wheel inspired by my grandfather who worked at Centerline Making forged aluminum rims

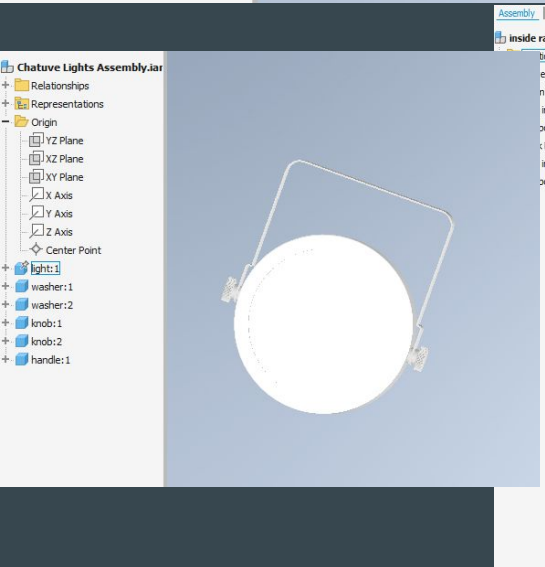


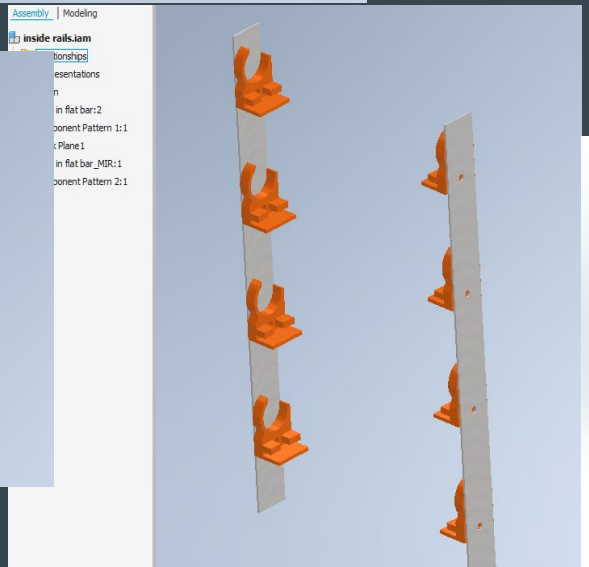
Assembly

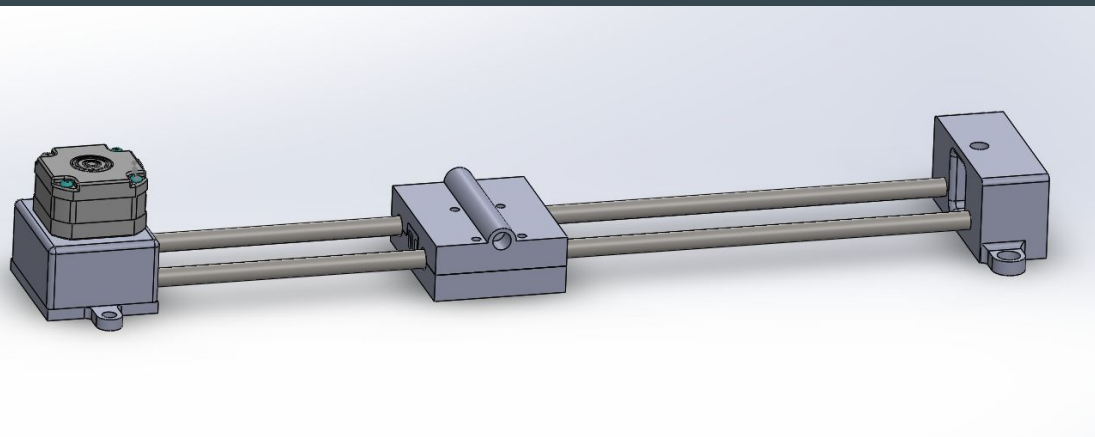
Ability in assembly using SW and Inventor. Very comfortable with over 4 years of experience in design/assembly/drawing space.

Three leftmost images are of a project where I made a case for stage lights. Case needed to be sturdy and lights easy to remove.

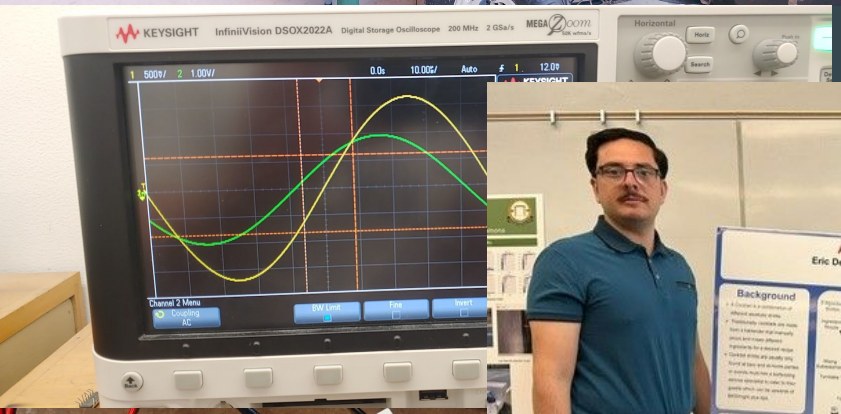
Bottom right picture is of a carriage I designed for control system class. Fully constrained carriage to move between the supports. Bearings and pulleys also implemented.

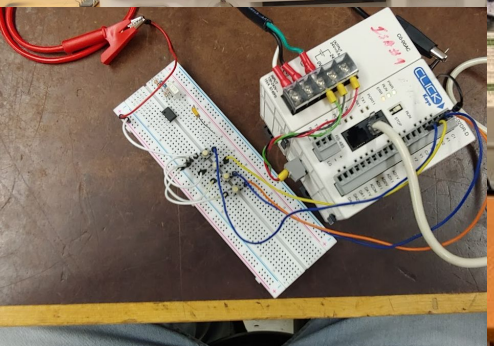


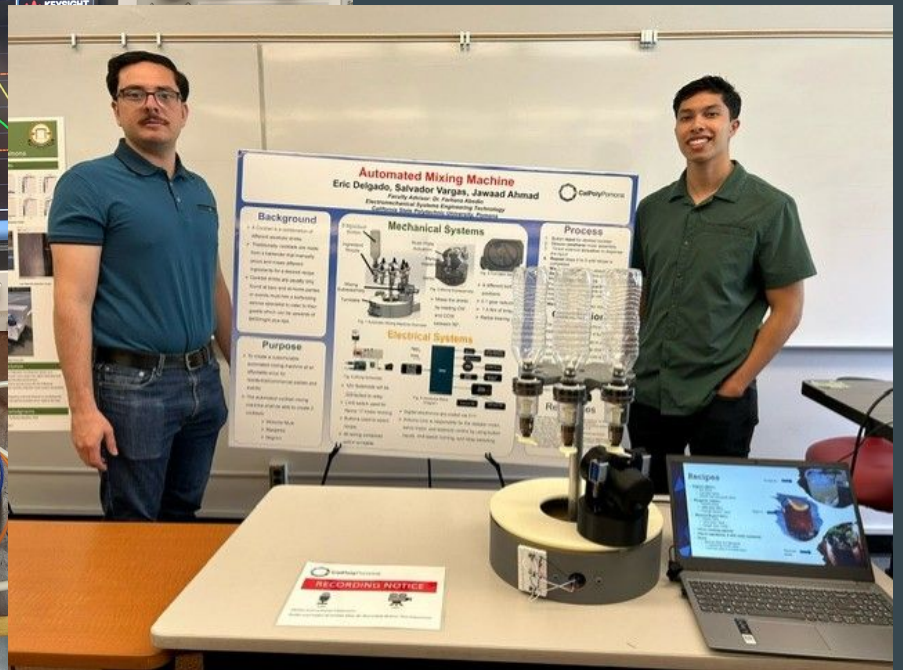




Cal Poly Pomona







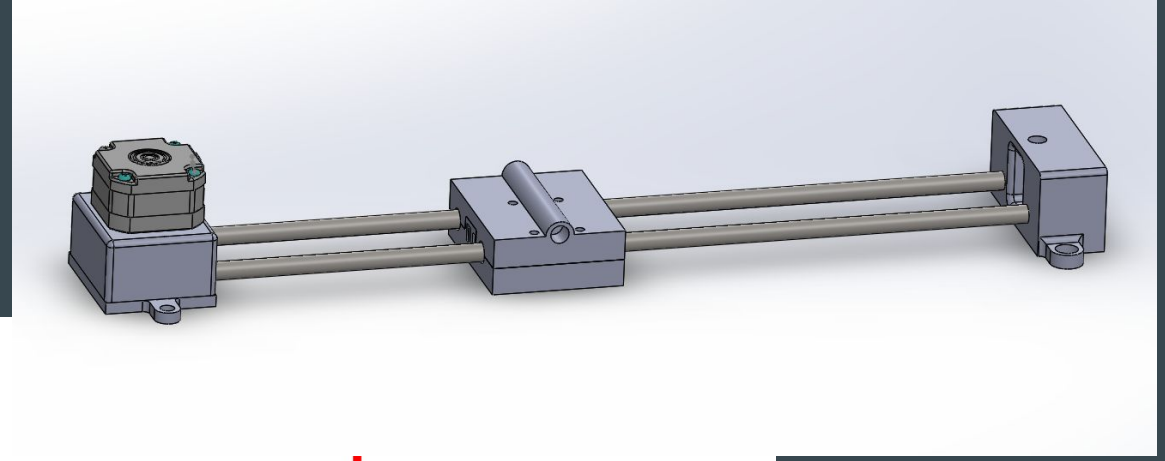
My time in Cal Poly Pomona was filled with frustrations, angst, and a lot of work but I also got to meet some great people. I meet my now best friend Diego, a manufacturing engineer, and many other people from BAJA SAE, labs, and study sessions.

Top two are of BAJA SAE and the car we built for 2023 - 2024.

- Designed wheel package
- Worked with electrical team on ESD project

Lower mid picture is of Eric and I at our senior symposium presenting our Automated Mixing Machine.

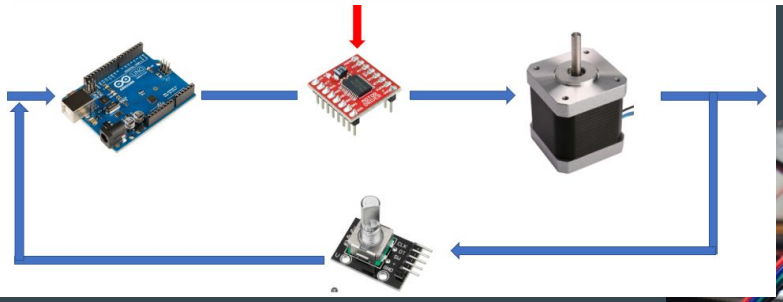
In retrospect, CPP was a rewarding experience which gave me the right knowledge, resources, and people to continue my career. I am grateful for the people that pushed me through these difficult times including my parents.

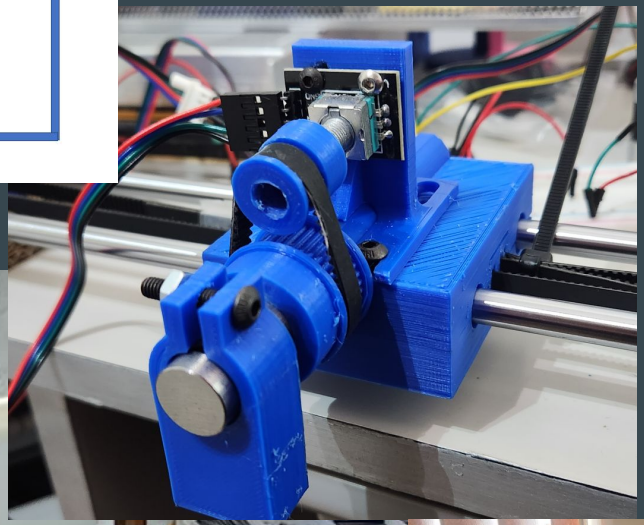


Inverted Pendulum

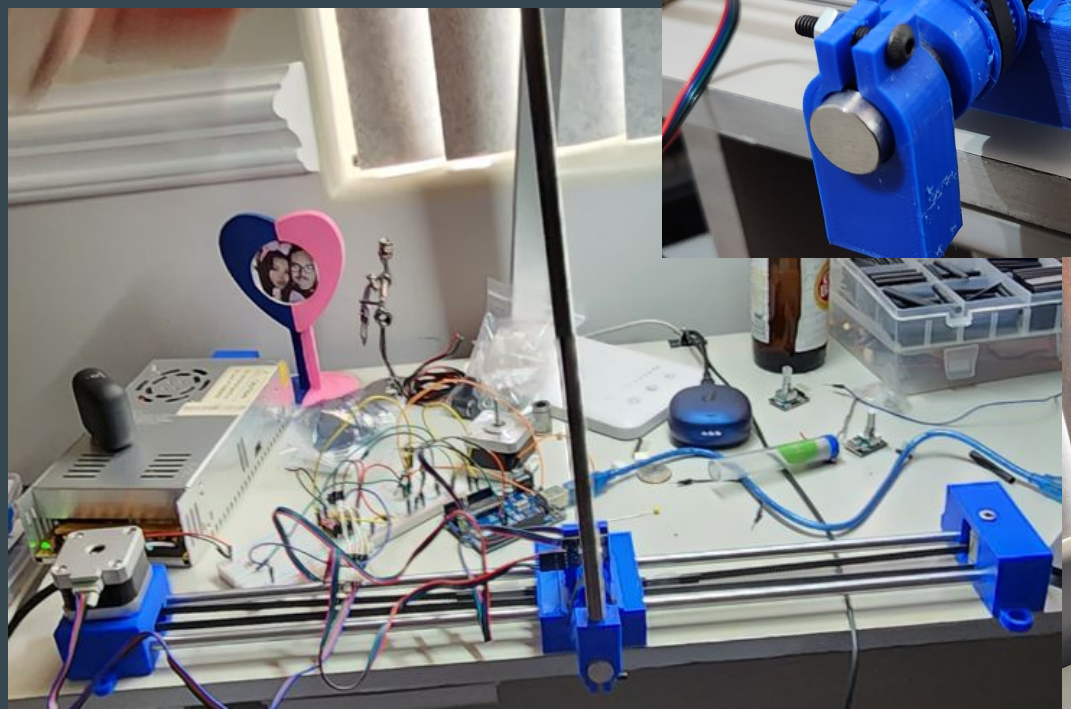
Instrumentations and controls project of an inverted pendulum. This project encapsulated subjects that we discussed il lecture including

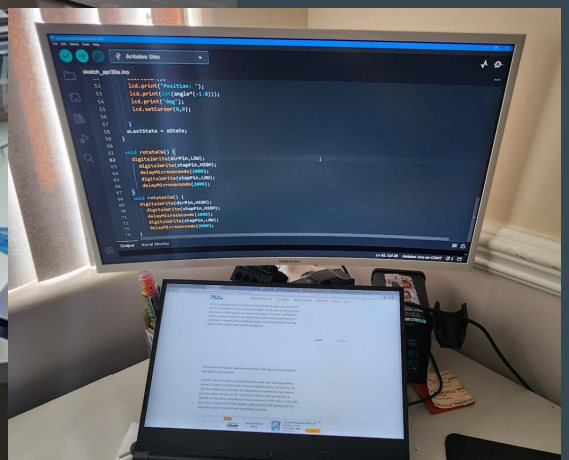
- Feedback loops
- Response times
- PID applications



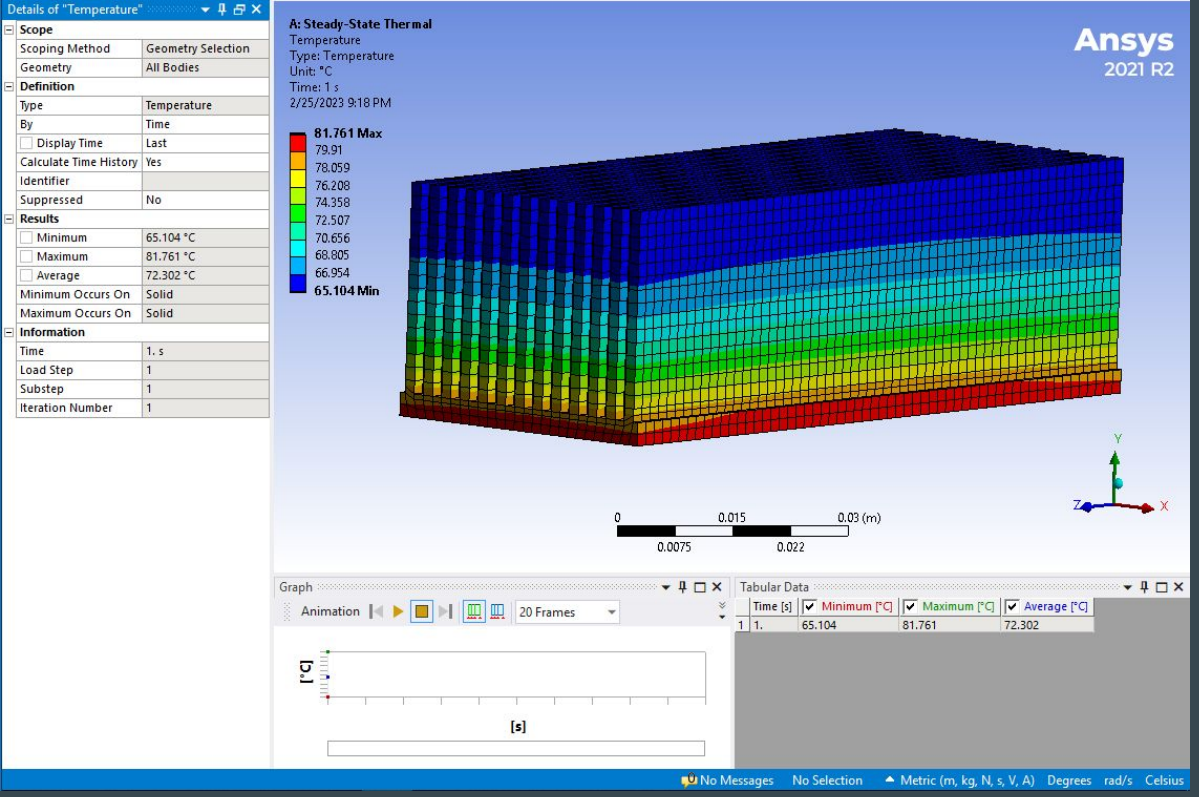


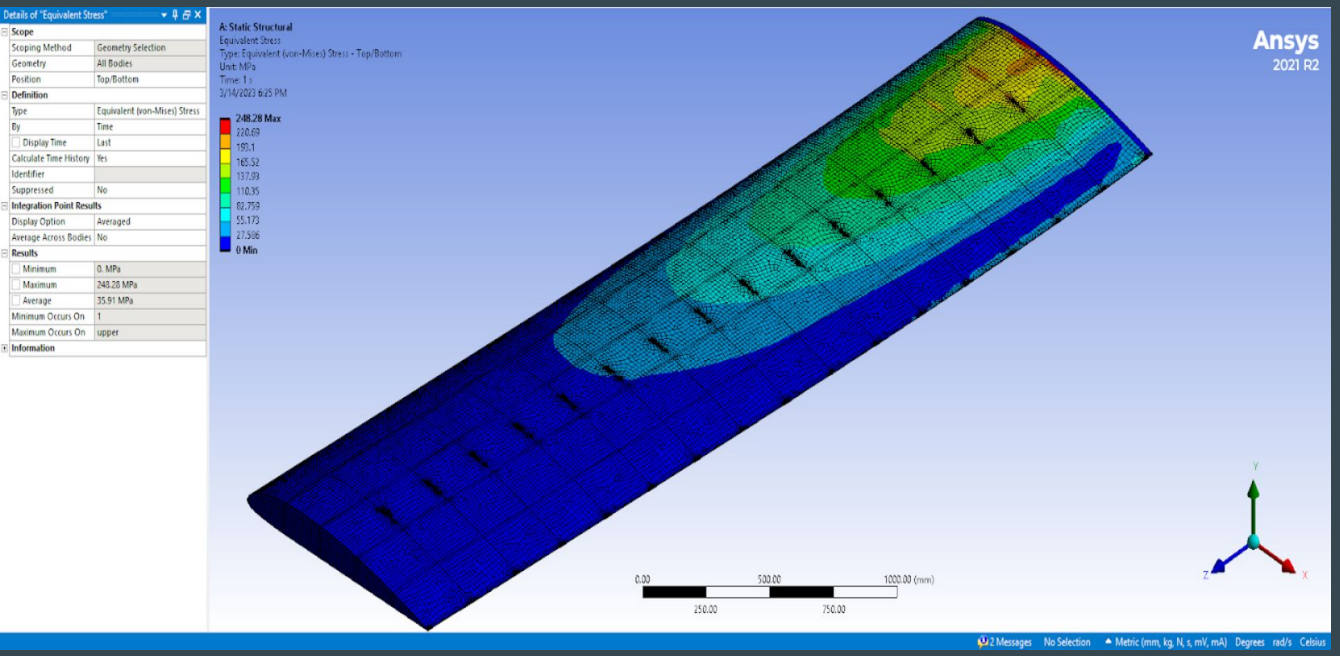
This project was really fun as it involved all aspects learned through my curriculum including programming, machine design, CAD, and controls. This inverted pendulum is the ultimate electromechanical project.





Finite Element Analysis



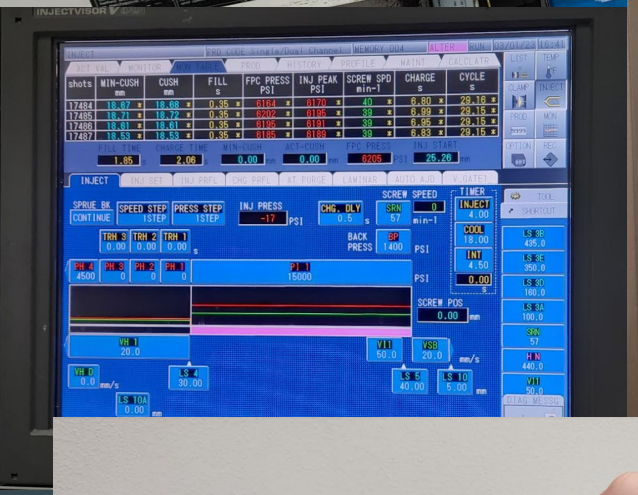


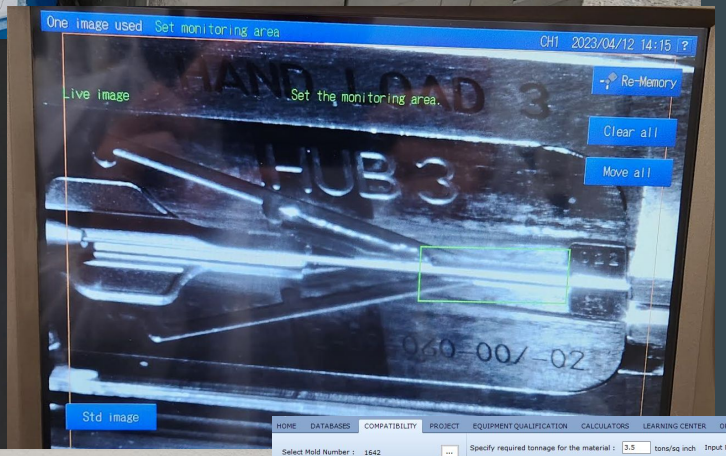
Some screenshots of Finite Element Analysis class I took as an elective. We used Ansys to design and conduct the finite method studies.

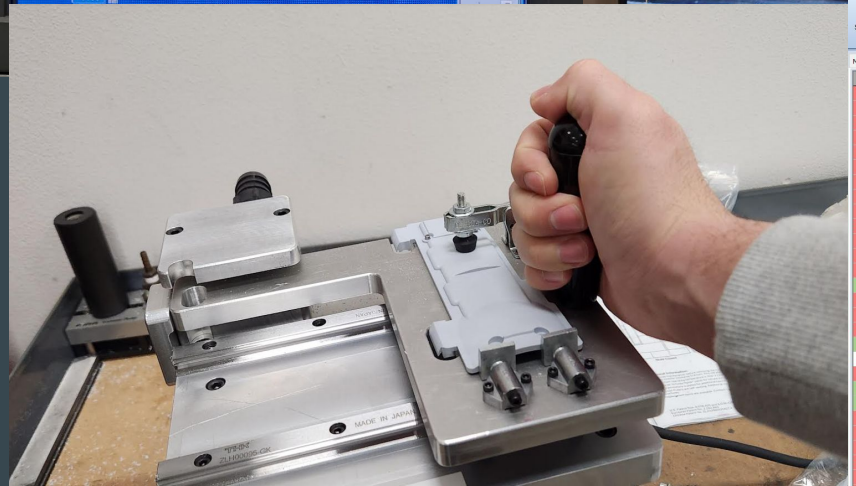
The top picture is an thermal analysis on a heat sink. Our group analyzed the effects of convection on a heatsink with air parallel and perpendicular to the fins.

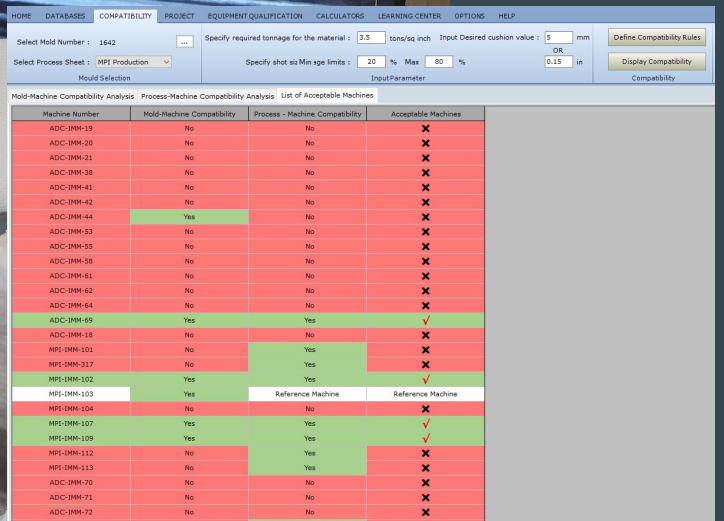
The bottom picture is of an airplane wing where we analyzed the loads on the ribs, spars, and skin of the wing. This labs objective was to find the Von Mises stresses and total deformation.

Mission Plastics Inc



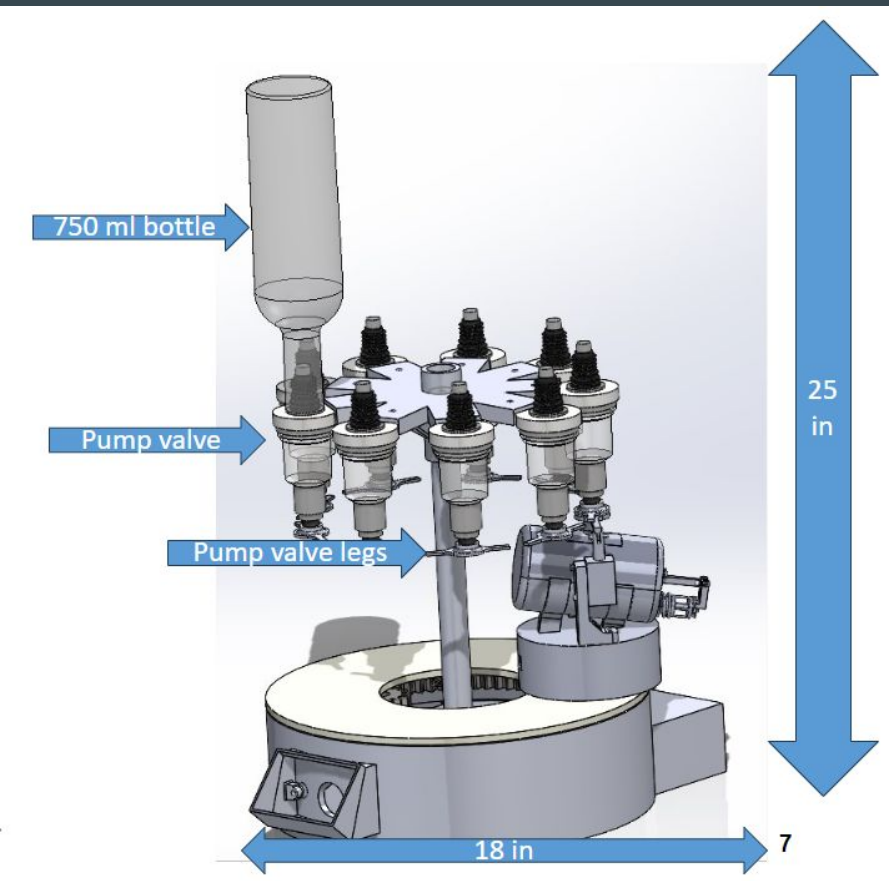


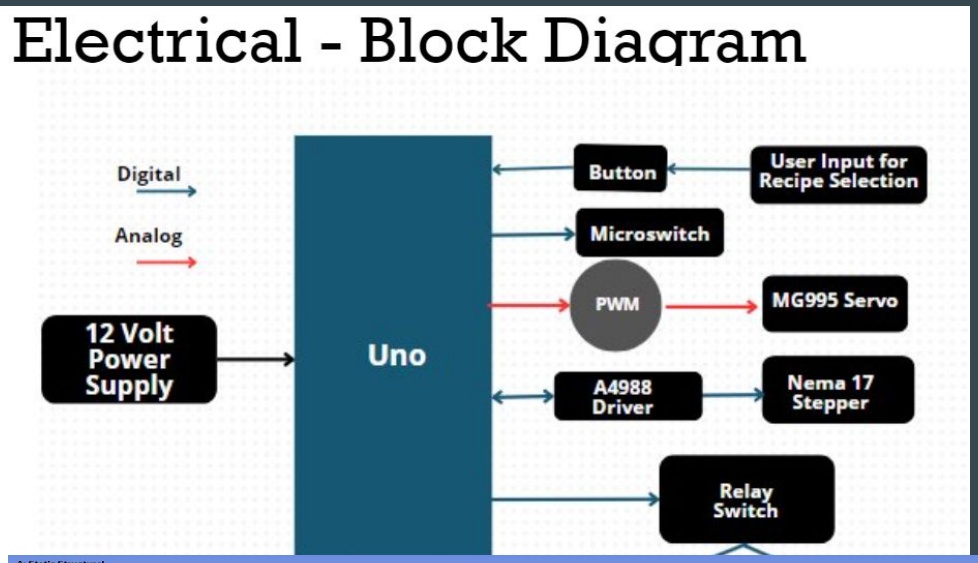


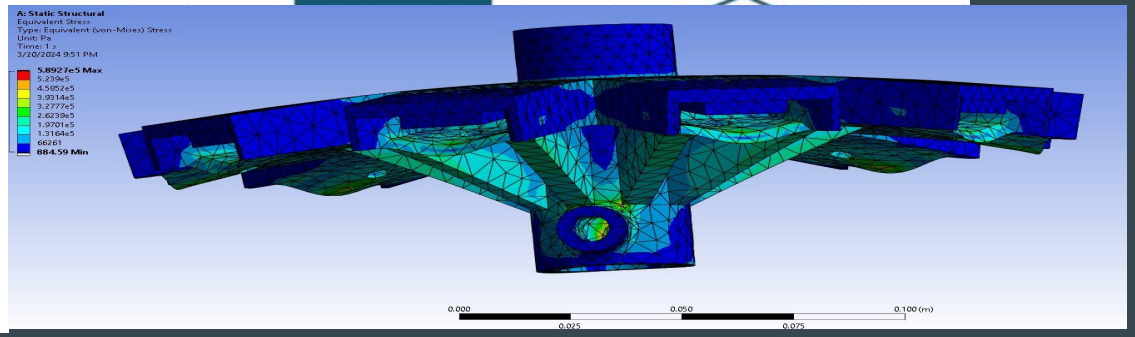


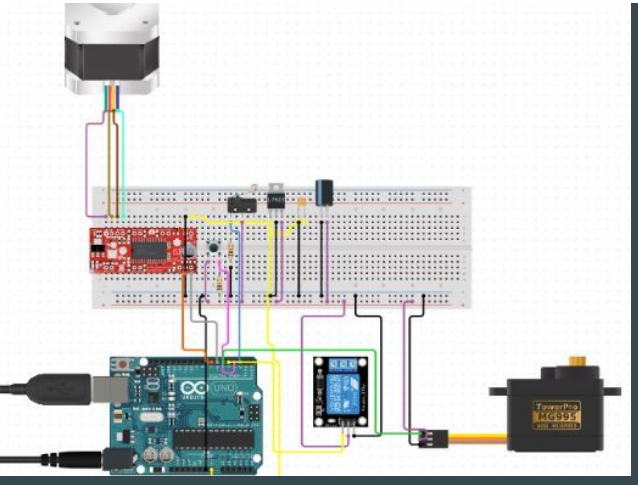
As a Manufacturing Engineer, My duties at Mission plastics involve helping the process engineers with scientific molding, safety cameras on the injection molding machines, robot arm automation, and design/maintain fixtures used for post production processes.

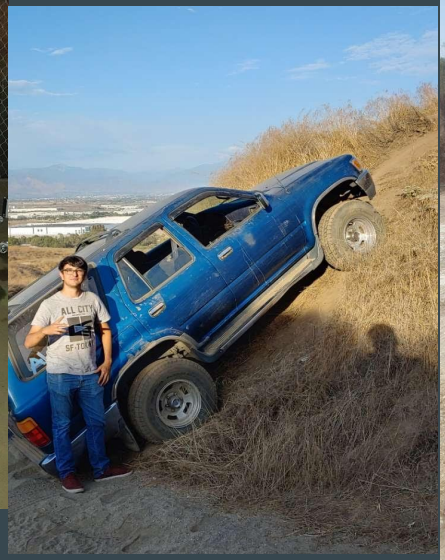
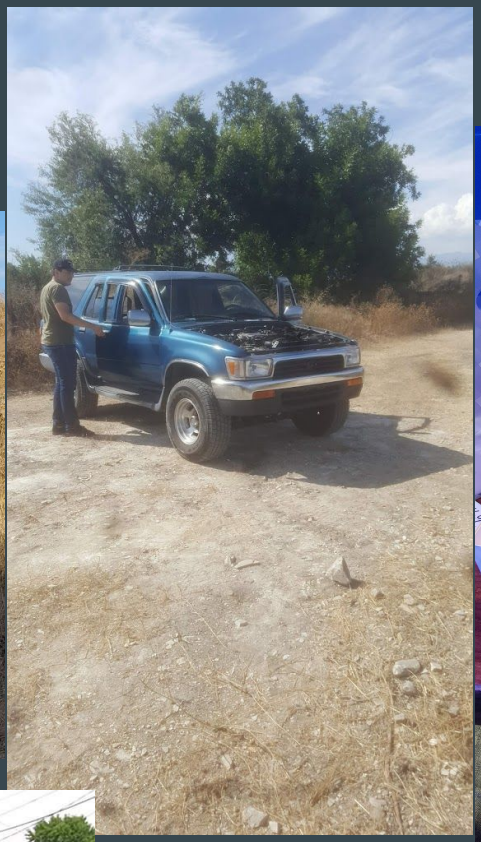
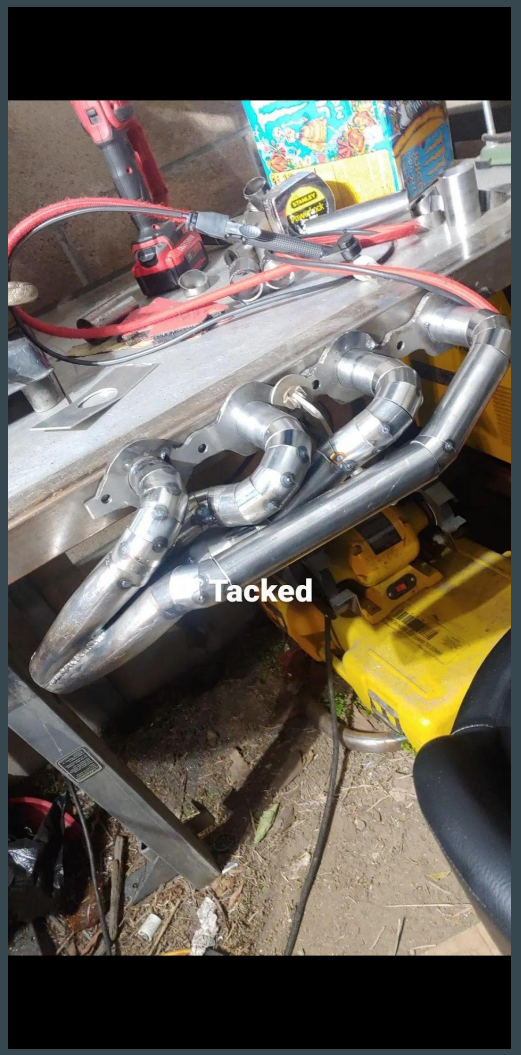
Senior Project - Automated Mixing Machine









- Automated Bartending process by creating a machine that makes 3 mixed drinks.
- Designed the control system and wrote the code for the Arduino using IDE
- FEA studies on critical load bearing parts.
- Able to produce a drink in 40s
- Under $350

Hobbies and Interests